Geophysical Research Abstracts, Vol. 8, 07531, 2006
SRef-ID: 1607-7962/gra/EGU06-A-07531

Monitoring the accuracy of IGS GNSS orbital solutions using ILRS laser range observations.

G. Appleby (1), T. Otsubo (2)

(1) NERC Space Geodesy Facility, Herstmonceux, UK, (2)) Kashima Space Research Center, National Institute of Information and Communications Technology, Japan (gapp@nerc.ac.uk)

In this presentation we bring up to date our use of precise laser range observations to carry out independent checks on the accuracy of published orbits of a subset of the GPS and GLONASS navigational satellites. Range measurements are regularly obtained by the ILRS tracking network to two of the GPS satellites and several of the GLONASS satellites, and were particularly prolific during the International CONT05 Campaign of September 2005. The laser range measurements are compared in two ways with precise orbits computed by the IGS; by direct comparison between SLR measurements and equivalent ranges computed from the microwave orbits, and by comparison of SLR-based orbits to the microwave orbits. We have found that it is of course necessary to understand both the potential for systematic range ambiguity induced by the laser reflector arrays and the need for accurate knowledge of on-satellite positions of the array phase centres. For the GLONASS and GPS satellites these parameters are now accurately known for the several different types of array currently in orbit, and the SLR results provide an accurate assessment of the radial quality of the IGS orbits, which is currently at a level of about 10cm RMS for both GLONASS and GPS. However, the well-known radial offset of a few cm remains between the laser measurements and the ranges computed from the radiometric orbits for the two GPS satellites, and may be indicative of a scale error in the GPS system. We further look forward to using similar techniques on the pilot satellites of the EU GALILEO navigational system. The first Galileo in-orbit validation element, GIOVE-A, was successfully launched on December 28 2005, and carries a cluster of laser range retroreflectors for future ranging experiments.